



Feast AND Famine, Flood AND Drought: Solutions and tools for building water-resilient communities

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In collaboration with: Ted van der Gulik, P.Eng., President, Partnership for Water Sustainability in BC; Eric Bonham, P.Eng., Founding Member, Partnership for Water Sustainability in BC; and Bob Sandford, author and EPCOR Chair for Water and Climate Security at the United Nations University Institute

Western North America may be crossing an invisible threshold into a different hydro-meteorological regime. Annual volumes of water entering and exiting regions are not necessarily changing. Instead, what is changing is how and when water arrives and leaves – its flood and drought! In December 2015, the Feast AND Famine Workshop addressed this over-arching question: What should we expect and what can we do to build “water-resilient communities”?

Held in Richmond, BC, and co-hosted by the Partnership for Water Sustainability and the Irrigation Industry Association, *Feast AND Famine* showcased solutions and tools to address risk and build resiliency. A decade earlier, the 2003 “teachable year” had set in motion water sustainability processes in BC, guided by a vision to develop solutions and tools that would help communities manage risk and build resiliency in response to a changing climate.

WETTER, WARMER WINTERS; LONGER, DRIER SUMMERS

The weather in 2015 has impacted how the public views the BC climate and their understanding of how it is changing. There is now growing awareness that the summer dry season has extended on both ends. BC communities can no longer count on a predictable snowpack and reliable precipitation to maintain a healthy water balance in their watersheds. 2015 is a teachable year, the first since 2003. This creates a window of opportunity to implement **solutions and tools** developed in BC.

What Happened to the Water Balance?

Bob Sandford, internationally known author, water champion and keynote speaker, provided this big picture context at the *Feast AND Famine Workshop*: “The drought that extended this past winter, spring and summer from Vancouver Island to Manitoba

and from Mexico to the Yukon is an indicator that Western North America may be crossing an invisible threshold into a different hydro-meteorological regime. After a period of relative hydro-climatic stability, changes in the composition of the Earth’s atmosphere have resulted in the acceleration of the global hydrologic cycle with huge implications. We can expect deeper, more persistent drought punctuated by flooding.”

A Solution: Design with Nature

Adaptation to a changing climate was a unifying theme. Designed to spark a conversation that would reverberate after the workshop, *Feast AND Famine* shared a vision for “designing with nature” to restore hydrologic integrity and maintain the seasonal “water balance.” Attendees were introduced to solutions and tools that can help communities achieve

water resiliency. Both the urban and agricultural perspectives were represented.

The workshop program comprised four cascading modules – from high-level visioning to ground-level applications. Each module was delivered by a team of two presenters.

A Teachable Moment

“The program was high-energy. Presentations were dynamic. Everyone is passionate about what they do. The collective enthusiasm of the presentation team energized those who attended. It was a memorable day,” reports Mike Tanner, Workshop Chair. The event attracted an audience totaling 115. It also attracted media attention, resulting in front-page headline stories in both of BC’s major daily newspapers. This led to further radio and TV coverage when the 2015 drought was voted BC’s top news story of the year in an online poll.

WHAT HAPPENS ON THE LAND MATTERS

Each module had an identified learning objective. For Module A, the objective was that participants would understand that accepting risk opens the door to creativity and results in innovation. If we all know the context for action, then together we can change the culture and instill a new ethic. And if we achieve the latter, we will create a legacy.

In Module A, Kim Stephens and Bob Sandford provided the BC and global contexts, respectively and then interacted with the audience in a town-hall style “sharing & learning” session. The energy this approach created set the tone for the workshop day. Bob Sandford elaborated on the value of understanding the history of water policy and management in California. He also made the case for “restorative development.” Kim Stephens introduced three provincial game-changers that enable restorative development in BC.

Game-Changers Enable Action

During the late 1960s, BC began its multi-faceted and ongoing journey towards sustainability. It has taken the past decade to begin implementing a policy, program and regulatory framework that makes water-resilient communities achievable. Milestone years in this journey are 2003 (“the teachable year”), 2008 (“the call to action”) and 2014 (“game-changers”). A unifying theme for these three milestone years is design with nature and build greener communities.

The workshop unveiled the branding graphic for the three game-changers, namely: Develop with Care 2014, the *Water Sustainability Act*, and Asset Management for Sustainable Service Delivery: A BC Framework. As illustrated by Figure 1, the three are a mutually reinforcing package. The three enable necessary actions by local governments to protect and/or restore the natural pathways by which rainfall reaches streams. This would achieve the goal of redistributing the seasonal water balance to restore hydrologic integrity in urban areas.

“We had no idea until recently of how much influence the hydrological cycle has on our day to day lives or on the broader conditions that define the distribution and diversity of life on this planet. It has been very difficult even for experts to grasp the full extent of what the loss of relative hydrological stability means,” stated Bob Sandford.

HOW ARE LOCAL GOVERNMENTS RESPONDING?

The Cowichan Valley Regional District and District of North Vancouver are incubators for water balance approaches at the regional and municipal scales, respectively. In Module B, Keith Lawrence and Richard Boase showcased solutions that their respective organizations are pioneering.

Changing How Decisions Are Made

“Recurring region-wide consequences of water-related challenges have prompted regional action to develop governance structures and processes to make the connections between high-level decision making and actions on the ground. The *Regional Surface and Ground Water Management and Governance Study* identified co-governance with First Nations as a primary condition for success in managing regional water resources,” stated Keith Lawrence. “It is proposed to apply whole watershed thinking and follow a risk-based approach to decision-making and management across the region.”

Climate Change Adaptation Strategy

Richard Boase presented the first public unveiling of North Vancouver’s work-in-progress Climate Change Adaptation Strategy. He explained how the District had applied a five-step BARC process (*Building Adaptive & Resilient Communities*).

The Shifting Baseline Syndrome concept, published by Dr. Daniel Pauly of UBC in 1995, provides a frame-of-reference for the strategy. “Dr. Pauly observed that ecological standards are lowered almost imperceptibly with each new generation. This results from lack of knowledge of the historical condition of the environment. The existing condition is accepted as the normal condition. It is so important that we recognize this syndrome, and that each of us take steps and measures to avoid the shifting baseline.”

WILL THERE BE SUFFICIENT WATER FOR AGRICULTURE?

In Module C, Ted van der Gulik and John ter Borg explained the complexities of water supply for agricultural lands in the Fraser River delta, what impacts sea level rise may have, and how climate change will affect water demand to grow our food.

How Will the “Salinity Wedge” Move Upriver?

Many local governments draw water from the Fraser and distribute it to farmers through a network of channels and ditches. For agricultural lands near the estuary, however, this water supply may be jeopardized by a combination of two factors: sea level rise which extends the reach of the salinity wedge upriver; and lower flows in the Fraser during the summer months.

Replacement of the George Massey Tunnel (with a bridge crossing) will allow for dredging of the river channel to accommodate deeper draft ships, which would likely result in movement of the salinity wedge during lower river flow and impact agricultural water supply.

What about Food Security?

“Agriculture is a large fresh water user and the demand for water will only increase as summers get longer, hotter and drier,” stated Ted van der Gulik. “BC needs 215,000 hectares of irrigated agriculture to feed our current population. The approximately 28,000 irrigated hectares in

Figure 1: Game-Changers

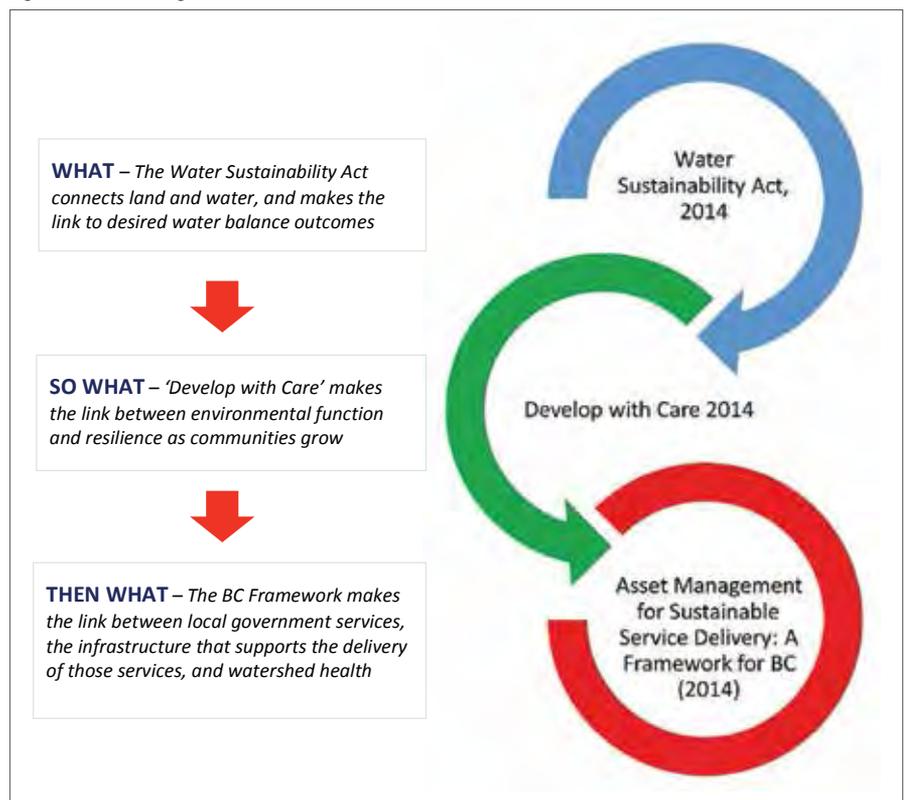
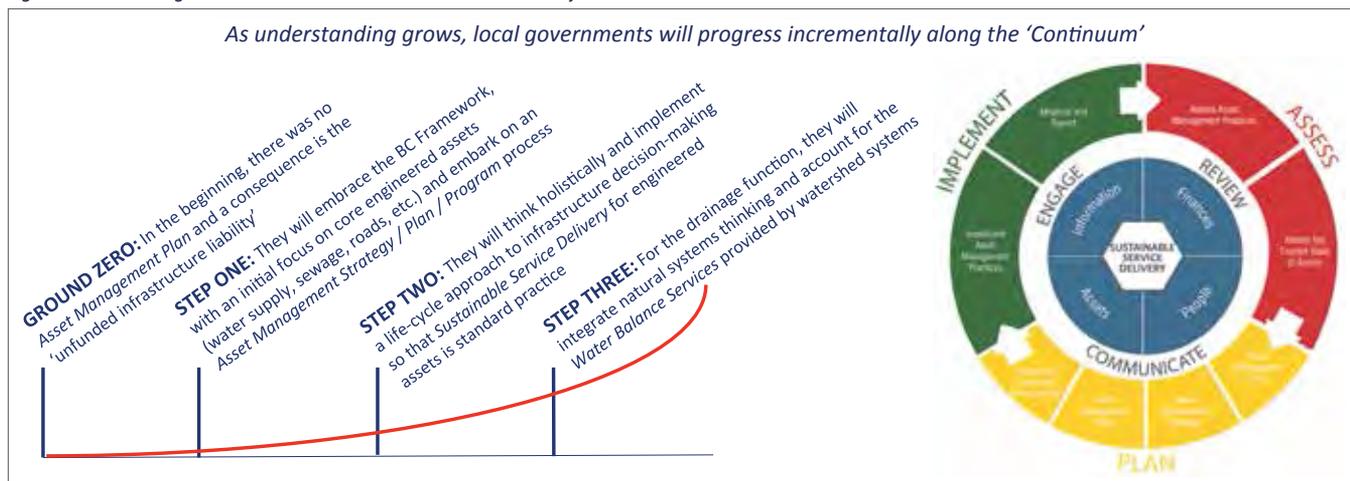


Figure 2: Asset Management Continuum for Sustainable Service Delivery



the Lower Mainland (13,000 in Metro Vancouver plus 15,000 in the eastern Fraser Valley) compares with about 20,000 in the Okanagan Valley. With careful planning, the irrigated area in the Lower Mainland could be increased to 69,000 hectares at buildout. From both the food security and resiliency perspectives, this underscores the strategic value of agricultural land in the Fraser Valley."

Ted's perspective provided the Vancouver Sun with a lead-in for its headline story: "I support market gardens. They're good. It is great to see residents grow their own food in urban areas. However, market gardens do not provide a significant source of food for our provincial needs — don't sell them as being a significant part of the provincial food security plan."

SUSTAINABLE WATERSHED SYSTEMS, THROUGH ASSET MANAGEMENT

In Module D, presentations by Glen Brown (Union of BC Municipalities) and Kirby Ell (Irrigation Industry Association) allowed the audience to leave the workshop with food for thought on practical measures that accumulate to make a big difference.

Kirby Ell explained the new High Efficiency Irrigation Standard (HEIS), an online assessment tool. Landscape irrigation can use up to 50% of the summertime domestic water demand, yet is rarely more than 50% efficient. Improving irrigation system efficiency can significantly reduce water demand, stretch water supplies and help protect watersheds.

Watersheds as Infrastructure Assets

Glen Brown introduced the Asset Management Continuum for Sustainable Service Delivery (Figure 2). "Implementation of asset management along with the associated evolution of local government thinking is a continuous process, not a discrete task. We needed a way to illustrate this diagrammatically. This led us to the concept of a continuum," he explained. "The continuum bridges two pieces. One piece is recognition that the asset management process is founded

on an incremental approach. The other piece is integration of natural capital, natural assets and watershed systems thinking."

A watershed is an integrated system. The natural pathways by which rainfall reaches streams are infrastructure assets and those pathways provide water balance services. This is why it is necessary to protect and/or restore hydrologic integrity in urban areas to preserve or redistribute the seasonal water balance.

LOOKING INTO THE FUTURE

"The sub-title for the *Feast AND Famine Workshop* could very well be LEADERSHIP, PROCESS, CREATIVITY and the ROLE OF CHANGE AGENTS, for this is what we heard. People, in each of their areas of expertise, are making change on the ground," stated Eric Bonham when he provided a rousing finish to the day with his reflections on what he had heard and observed.

Innovative Strategies Required Now

So what were the fundamental lessons garnered from *Feast AND Famine*, and how can we apply those lessons to the future planning of our urban and agriculture communities?

Bob Sandford set the context with his key observation that hydro-climatic stability, once fairly dependent, is no longer the case. Innovative strategies that address the challenge of drought or flood are now required. This reality has an immediate impact on future water, energy and food security.

Towards Consensus, Commitment and Collaboration

Given this context, Eric Bonham noted that future planners, engineers, politicians, and citizens alike will be called upon to demonstrate both vision and pragmatism, and be able to frame the issue of achieving water-resiliency in communities against the backdrop of an unpredictable water cycle. This in turn demands the honing of a further skill; that of working together towards consensus, commitment and collaboration.



Such collaboration is essential and must cross all political and community boundaries, for climate change is no respecter of such creations. This will not come easy and will call for cooperation on a level heretofore not considered necessary or even possible, which brings to mind that old adage "united we stand, divided we fall."

Think like a Watershed

Water is truly the connector of all activities on earth, whether it is the economy, ecology or the well-being of human and non-human alike. The hydraulic practitioners of the future will be encouraged to "think like a watershed," recognizing the invaluable contribution of natural systems.

In summary, think creatively as well as collaboratively and search for "outside the pipe" solutions to the pending changes anticipated from climate change. Albert Einstein had his finger on the pulse when he noted: "No problem can be solved from the same consciousness that created it. We have to learn to see the world anew."

To learn more about the workshop, visit www.waterbucket.ca/cfa/category/on_the_ground_changes-in-british-columbia/2015-feast-and-famine-workshop/

ABOUT THE AUTHORS



KIM STEPHENS: His four decades of experience as an engineer-planner cover the spectrum of water resource and infrastructure engineering issues.

Provincially, he has had a leadership role in a series of initiatives related to water sustainability, watershed health, rainwater management and green infrastructure. In 2009, Kim received a *Premier's Award for Excellence and Innovation*. He has been invited to speak on 'the BC experience' and make keynote presentations at forums throughout North America, as well as in Australia. In 2015, he was invited by US Senator Patrick Leahy of Vermont to provide inspirational remarks at the 2nd Leahy Environmental Summit.



Bob Sandford speaking at the Feast AND Famine workshop.



Richard Boase speaking at the Feast AND Famine workshop.



TED VAN DER GULIK: When he retired from government in 2014, he was the Senior Engineer in the Ministry of Agriculture. Ted built an international reputation for his work in agricultural water resource management. His contributions go beyond agriculture and encompass integrated watershed planning initiatives. During his career, he led numerous water projects that had an impact on individual farms, entire communities and watersheds. The many guides and manuals he wrote are used locally and around the world. Ted's accomplishments include three *Premier's Awards of Excellence*: Water Balance Model (2009); Agriculture Water Demand Model (2010); and Legacy (2014).



ERIC BONHAM: He is a civil engineer with a political science degree and 50-plus years of water-centric experience. He is a former Director in two provincial ministries – Environment and Municipal Affairs. A keen believer in community stewardship, he is a Director of the BC Lake Stewardship Society and was actively involved in park creation on Vancouver Island. He was named an Honorary Citizen of Victoria for his contribution to the community and has received awards from a number of organizations for his contribution to water management issues in BC.



BOB SANDFORD: He is the co-author of the UN *Water in the World We Want* report on post-2015 global sustainable development goals relating to water. He is committed to translating scientific research outcomes into language decision-makers can use to craft timely and meaningful public policy and to bringing international examples to bear on local water issues. He co-authored *Flood Forecast: Climate Risk & Resilience in Canada* (2014). His latest book is titled *Storm Warning: Water & Climate Security in a Changing Canada* (2015). 💧

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